BNFL Inc.

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Synopsis

BNFL Inc. has entered into a privatization contract with the US Department of Energy (DOE) for pre-treatment and immobilization of approximately 55.5 million US gallons of radioactive waste currently stored in underground tanks at the Hanford Site. The work will be accomplished in two phases; Phase I, Part A was completed in 1998 and consisted of a technologies demonstration, a conceptual design, safety and regulatory licensing, and a financial plan. Phase I, Part B is divided into Parts B-1 and B-2. Part B-1 will be effective from August 24, 1998 through August 23, 2000, after which time Part B-2 will commence. Phase II begins after Part B-2 is complete. During Part B-1, BNFL Inc. will confirm the design to about 25 – 30 percent complete. The TWRS Privatization facilities will occupy approximately 55 acres of land in the 200-East Area of the DOE Hanford Site in Richland, Washington.

The Part B-1 contract requires a Design Safety Feature (DSF) deliverable at six months from authorization. It is understood for the purpose of this deliverable that DSFs are those aspects of important to safety (ITS) structures, systems and components (SSCs) that give assurance that the SSC will perform its safety function. The scope and content requirements for the deliverable were determined in working meetings between BNFL Inc. and the DOE Regulatory Unit (RU) and documented in DOE letter 98-RU-0329. During development of the scope and content, it was agreed that BNFL Inc. would submit two categories of information that would demonstrate the listed elements in the scope document. These elements comprise the integrated safety management (ISM) process to be used for identification of DSFs.

The first category provides a description of planned ITS SSCs and associated DSFs, based largely on experience.

The second category is information that provides ten representative examples of application of the ISM process, each encompassing only one selected specific hazardous event sequence.

For Category 1, ITS SSCs and associated DSFs that are known, expected or reasonably likely were identified. Both normal operations and accident scenarios have been considered for identification of ITS SSCs and DSFs. All SSCs were initially considered to have the potential to be classified as ITS. They were documented in comprehensive descriptions and/or lists based on the existing TWRS-P design and BNFL experience with similar facilities. The final selection of ITS SSCs and DSFs will be performed in accordance with the BNFL Inc. Integrated Safety Management Plan which will take account of the results of consequence and frequency analysis.

The number of identified generic ITS SSCs (568) and DSFs (1003) are indicative of the number of types of ITS systems and structures, and some components, and their associated DSFs, for the final facility.

For Category 2, ten representative examples were selected to demonstrate application of the ISM process to systematically define ITS SSCs and DSFs. They were selected to give the range of consequences and hazard types requested by DOE. The selections were chosen based on assessments in the Hazard Analysis Report (HAR), the Initial Safety Analysis Report (ISAR), judgment and experience. The ten examples were proposed by BNFL Inc. and the DOE RU concurred.

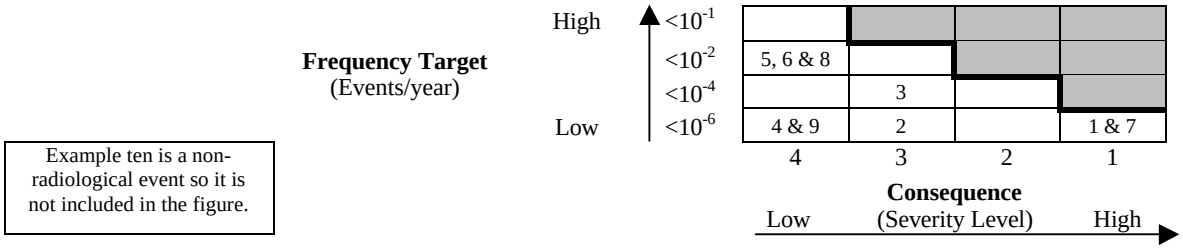
Each of the ten examples demonstrate how BNFL Inc. has applied the ISM process to identify work, evaluate hazards, develop control strategies, and identify standards. Application of the process included consideration of the operating environment, potential faults, unmitigated consequences, event frequencies, control strategy selection from multiple options, setting of reliability targets and performance

requirements, selection of standards and administrative measures, defense in depth, and other relevant subjects. The control strategies incorporate defense in depth through multiple mitigation features that include robust ITS SSCs with protective DSFs.

While preparing the assessment analyses for the ten examples, a number of assumptions had to be made about the design and future operations in order to calculate consequences, estimate frequencies, select control strategies, select SSCs, select DSFs and select standards. The number of design assumptions, 73, and operational assumptions, 59, reflect the design status of about three percent. The 132 assumptions will be eliminated by finalizing designs and operational plans during the remainder of Part B.

The following are summary results from producing this deliverable:

- Mitigated consequences and frequencies, based on application of the ISM process to the ten representative examples, are well within the acceptable range while using conservative, but reasonably expected, control strategies and resulting ITS SSCs and DSFs.



- Extensive use has been made of proven engineering practices established on BNFL facilities processing materials with similar or greater source terms than TWRS-P.

- A multitude of SSCs and DSFs were identified during the Category 1 and Category 2 efforts:

	SSCs	DSFs	Description
Category 1	568	1,003	Generic List by Functions
Category 2	82	164	Event Specific List

- All ITS SSCs and DSFs for TWRS-P have analogues in place and are operating successfully in other BNFL facilities, e.g., Sellafield, with only two exceptions and these are for intermediate hazard level operations.

- BNFL Inc. forged a strong team effort with a tightly integrated group of operations, engineering, and safety personnel during the preparation of the Design Safety Features deliverable.

- Experienced staff from BNFL facilities in the United Kingdom and TWRS-P team member companies have been added to TWRS-P to ensure success for this deliverable, the PSAR and other regulatory subjects.

- BNFL Inc. has demonstrated the process knowledge and ability to implement the requirements of the ISM process.

- The data submitted in this deliverable are preliminary and are likely to change as the design matures.

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